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ABSTRACT

The Language Information Network and Clearinghouse System (LINCS) Project of the Center for Applied Linguistics was designed to be a formal, adaptive network of individuals and organizations whose objective is to facilitate the transfer of scientific information within the language science community. It is intended to improve on formal channels of communication within the field, including computerized information management and specialized information services and products. The report provides background information about the LINCS Project and describes its three projected phases (preliminary, program definition, and system acquisition), outlining their components and specific objectives. (MSE)

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CENTER FOR APPLIED LINGUISTICS

LANGUAGE INFORMATION NETWORK AND CLEARINGHOUSE SYSTEM (LINCS)

THE LINCS PROJECT

An Outline of Current Activities

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PREFACE

This outline of the Language Information Network and Clearinghouse System (LINCS) Project has been prepared in response to a demand for summaries of the Project's current status and background. Detailed information and technical data are presented separately in the documents listed on pages ii-iv.

The LINCS Project has been supported by National Science Foundation Grants GN-653 and GN-771 to the Center for Applied Linguistics, for the implementation of its proposals entitled An Information-System Program for the Language Sciences. For administrative purposes, the LINCS Project is included in the Center's Linguistic Documentation Program.

The following persons and organizations have collaborated during one or more of the Project's three Stages. John Lotz, director of the Center for Applied Linguistics, is the Project's administrator. In addition to A. Hood Roberts, Robert R. Freeman (to 1968), and Alfred Pietrzyk (principal investigators), the following Project staff members have contributed substantive or clerical efforts: Douglas Campion, Bedrich Chaloupka, Steven Christensen, Harry Gilbert, Laila Khoury, Margaret Kocher, Rita Koozer, Judith Krone, Frances Lamberts, Mary Levy, Kathleen Lewis, Ludmila Okreglak, Susan Paulus, Janet Prochazka, Joan Vis, Carl Wilson, Bonita Zarger, and Charles Zisa. Consulting support for certain tasks has been provided by Sanford Berg, Charles Bacon, William Creager, Joseph Ebersole, Paul Garvin, Carolyn Gifford, Giuliano Gnugnoli, Belver Griffith, Jessica Melton, Lily Ouyang, Miriam Rappaport, the Auerbach Corporation, Computer Resources Corporation, Information Dynamics Corporation, Publicate Incorporated, and the University of Toronto. A dialogue on strategic aspects is being maintained with officers of the Information Systems Program, Office of Science Information Services, National Science Foundation. Important advice has been received from various persons representing the professional community in the United States and in other countries.

The Principal Investigators
LINCS Project

LINCS PROJECT DOCUMENTS: NSF GRANTS GN-653 AND GN-771

1. Disseminated in 1968-69

LINCS #1-68. Information Dynamics Corporation. Parameter Requirements for Description of Alternative LINC Systems. Bethesda, Maryland: Information Dynamics Corporation and Washington, D.C.: Center for Applied Linguistics, March 1968. NSF GN-653.

LINCS #2-68. Lewis, Kathleen P. Indexing Tools and Terminology Sources in the Language Sciences: A Bibliographical Listing. Washington, D.C.: Center for Applied Linguistics, April 1968 [ERIC # ED 021 245]. NSF GN-653.

LINCS #3-68. Pietrzyk, Alfred, Frances Lamberts, and Robert R. Freeman. File-Management Techniques and Systems with Applications to Information Retrieval: A Selective Bibliography. Washington, D.C.: Center for Applied Linguistics, June 1968 [CFSTI # PB 178 792]. NSF GN-653.

LINCS #1-69. Garvin, Paul L., et al. Some Opinions concerning Linguistics and Information-Processing. Washington, D.C.: Center for Applied Linguistics, May 1969. NSF GN-771.

LINCS #2-69. Freeman, Robert R., Alfred Pietrzyk, and A. Hood Roberts. An Information-System Program for the Language Sciences: Final Report on Survey-and-Analysis Stage, 1967-1968. Washington, D.C.: Center for Applied Linguistics, June 1969. NSF GN-653.

LINCS #7-69. Principal Investigators, LINCS Project. The LINCS Project: An Outline of Current Activities. Washington, D.C.: Center for Applied Linguistics, September 1969. NSF GN-771.

2. In Preparation

LINCS #3-69 P. Publicate, Inc. Preliminaries to a Survey of Document Characteristics. Bethesda, Maryland: Publicate, Inc. and Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-653.

LINCS #4-69. Krone, Judith. A Case Histories Study of Research and Publication in the Language Sciences. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-653.

LINCS #5-69. Varley, Joy. The Language Research in Progress System of the Center for Applied Linguistics. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-653.

LINCS #6-69. Center for Applied Linguistics. An Inventory of Information Services in the Language Sciences. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-653.

LINCS #8-69. Auerbach Corporation. Requirements for LINCS File Management System. Philadelphia: Auerbach Corporation and Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-771.

LINCS #9-69 P. Ouyang, Lily and Belver Griffith. A Preliminary Interview Study of Scientifically and Scholarly Active Linguists. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-771.

LINCS #10-69. Zisa, Charles et al. Studies of the LINCS User Community. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-771.

LINCS #11-69. Griffith, Belver. A Study of Information Patterns of the Linguistic Society of America Membership. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-771.

LINCS #12-69. Levy, Mary M. Information Flow in the Language Sciences: An Exploratory Case Study of the Washington, D.C. Area. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-771.

LINCS #13-69. Rappaport, Miriam W. A Study of Citation Patterns in Selected Core Journals for Linguistics. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-771.

LINCS #14-69. Creager, William. Bases for the Design of a Language Information Network and Clearinghouse System. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-771.

LINCS #15-69. Melton, Jessica and Alfred Pietrzyk (eds.). Preliminaries to the Design of Indexing Tools for a LINCS. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-771.

LINCS #16-69. Garvin, Paul L. Specialty Trends in the Language Sciences. Washington, D.C.: Center for Applied Linguistics, forthcoming. [Reproduced from LINCS Document #15-69.] NSF GN-771.

LINCS #17-69. Lamberts, Frances and Judith Krone. An Exploratory Study of Document Characteristics and Typographic Requirements in the Language Sciences. Washington, D.C.: Center for Applied Linguistics, forthcoming. NSF GN-771.

RELATED PUBLICATIONS

Freeman, Robert R., Alfred Pietrzyk, and A. Hood Roberts (eds.). Information in the Language Sciences: Proceedings of the Conference held at Airlie House, March 4-6, 1966, under the Sponsorship of the Center for Applied Linguistics. New York, American Elsevier, 1968.

Pietrzyk, Alfred (ed.). The Linguistic Bibliography Project: Final Report to National Science Foundation. Washington, D.C.: Center for Applied Linguistics, 1967 [ERIC # ED 024 421]. NSF GN-180.

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THE LINCS PROJECT: AN OUTLINE OF CURRENT ACTIVITIES

Prepared by the Principal Investigators, LINCS Project

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1. Background

The LINCS Project of the Center for Applied Linguistics seeks to provide crucial prerequisites toward the ultimate implementation, within a cooperative framework, of the concept known as a Language Information Network and Clearinghouse System (LINCS).

In a general sense, the LINCS concept is intended to provide comprehensive, modern solutions to discipline-wide problems of information transfer in the language sciences, in line with similar national and international efforts in other fields of science and technology. In this context, the term 'language sciences' is used in a pragmatic, functional sense. It refers broadly to a comprehensive spectrum of specialties and topics in linguistics and related fields. It is meant to cover general and applied linguistics, as well as interdisciplinary implications of the study and uses of language. With regard to their basic research objectives and numerous practical applications, the language sciences are significant in many areas of human and national endeavor -- a fact which has been emphasized by various spokesmen of the scientific and technical community and by the news media. On the basis of society memberships alone, the language sciences are in their scope comparable to several of the more important scientific disciplines.

From a technical point of view, LINCS is to be a mainly formal, adaptive network of individuals and organizations, the objective of which is to offer a set of products and services which, by analysis, organization, criticism, storage and dissemination, facilitate the transfer of scientific information through printed, oral, and other media to, from, and within the community defined by interest in some aspect of the study of language.

The specific design characteristics of a LINCS cannot be predicted without the detailed findings expected as a result of further Project activities. However, it is reasonable to assume that the design alternatives will include several modes of decentralization,

possibly one or two central clearinghouses providing modern, computer-based switching facilities, a limited number of subnetworks corresponding to major subfields in the languages sciences or to geographic divisions, and a variety of nodes in the total network -- mainly specialized information centers of which a considerable number is already in existence. The functional integration of these components will be attempted on the basis of detailed descriptive and quantitative studies of the subject areas and information channels in the language sciences.

The essential goal of the final system-design effort is to allocate the often limited language-information resources toward the implementation and operation of an optimal LINCS, in which the various components will interact to meet future requirements in a cooperative manner. For example, the current bibliographic coverage, which is deficient in various respects, could be handled in considerably more effective, flexible ways in a partly decentralized network system, providing for frequent issues on specialized topics, detailed indexing, current-awareness services, selective dissemination of information, annual cumulations, and eventually also reference retrieval on demand. Such services could, of course, be geared to other innovations, such as special data collections, information analysis centers, and the personalized dissemination of journal articles. The creation of interfaces between LINCS and other national and international information systems will be included among the Project's priorities. The prospects for shared facilities involving expensive equipment and processes will be given special attention.

Although the LINCS design effort will initially concentrate on improvements and innovations in the formal channels (e.g. publications), this cannot be done effectively without a thorough knowledge of the complex informal aspects of the existing communication system. A special emphasis is therefore being placed on studies of the informal, behavioral patterns of individual producers and users of language information. Above all, the service requirements, preferences, and evaluations elicited from the user community will always constitute the most important guide for the designers of LINCS. Eventually, the Project will also plan innovations for the informal channels such as oral communication and meetings.

The role of the Center for Applied Linguistics (CAL) with respect to the LINCS Project and its sponsor involves CAL's agency (representativeness), responsibility, and readiness -- prerequisites which are being continuously developed and strengthened.

CAL is an independent, non-profit institution concerned with language and linguistics. It was established in 1959 as part of the Modern Language Association of America. CAL was incorporated as an independent non-profit institution in 1964. In its professional activities, CAL maintains an impartial role, both nationally and internationally. CAL operates under a 20-member

Board of Trustees, representing the profession and the public at large. It is headed by a Director, who serves as President of the corporation, and is administered by the Office of the Director and the Office of the Controller.

As the agent responsible for the LINCS Project, CAL has the user community's mandate on the basis of its special relationships with the principal professional organizations in the language sciences. Within its numerous clearinghouse activities and cooperative projects, such as ERIC, the international Linguistic Bibliography of CIPL, and the MLA International Bibliography, CAL has always served a large clientele in the language sciences. CAL is now exploring measures to improve the national and international advisory functions of the professional community toward a more effective coordination of the LINCS Project.

CAL has accepted the delegated responsibility. The effective pursuit of this responsibility will be made possible by, among other things, the following basic measures: detailed specification of a system concept for LINCS; activities toward a credible plan for system acquisition; some degree of actual (non-trivial) progress in terms of the plan; explicit definition of all subgoals; all provisions needed for the Project's management and for the timely achievement, evaluation, control, budgeting, and ultimately, system acquisition (implementation) and operation.

CAL is ready to implement the tasks of the LINCS Project on the basis of (1) certain initial conditions and prerequisites, (2) the feasibility of the technical approach specified in its proposal documentation, and (3) realistic planning for each task in terms of initial conditions, duration, the application of resources. All of these points are covered in detail in the proposal work plan and budget.

The LINCS Project has been proposed in response to two sets of vital needs.

First, as in the case of other disciplines, the language sciences are faced with certain basic needs. They must, above all, satisfy the contemporary user demands for volume, quality, specificity, promptness, compatibility, availability, and flexibility in the transfer of language information -- factors which are not yet clearly understood and which are among the chief objects for study in this Project. On the basis of data collected thus far, it is reasonable to assume that crucial aspects of existing information services are not developed to their fullest potential. The problem is by no means confined to the formal channels, such as journals, bibliographies, reviews, and data banks. The first results emerging from studies of the informal communication networks point to the existence of additional, more complex needs in the information-seeking behavior of various individuals and groups. There is little doubt that considerable improvements are called for. The most

common solution emphasizes local or ad hoc approaches within a given information center, and the measures directed toward particular needs are often impressive. However, current experience indicates that information can be exchanged under cooperative arrangements, and that certain facilities can be shared advantageously. The significance of cooperation should be considered against the background of the comparatively modest financial resources available to the language profession. Important bibliographies and certain other services continue to depend on external support. In spite of this fact, there are numerous instances of costly duplication. There is, as yet, no large-scale, organized sharing of resources, facilities, inputs, and outputs. Consequently, important economic benefits, and important substantive and technological advantages have not been available to the language sciences. The situation is made more complex by the fact that a large part of the language-sciences literature is published in many different languages.

The second set of needs is created by the circumstance that information-system planning on a discipline-wide scale must inevitably face problems associated with large-scale systems. In such cases, an information system must serve a user community which is large in size, widely distributed, varied in its subject interests and service requirements, and dynamic in its growth and change patterns. It is assumed that all of these factors characterize the community of users interested in language-sciences information. In addition to the needs of professional linguists, the problem being explored by this Project covers a number of significant uses of language information in science, technology, and the humanities, particularly in the social and life sciences, education, communication research, mathematical and computational studies, government, industry, and in various practical applications to urgent language, literacy and reading problems occuring in a social or medical context. The economic visbility of a future language-information system may depend on the manner and degree in which it interacts with this wider clientele. There is therefore a need, clearly recognized by this Project, for modern management techniques, which in turn require special approaches to the collection, measurement and analysis of numerous facts in the current information pattern.

2. Project Phases

With the foregoing needs in mind, planning for the LINCS Project has provided for the following phases: (1) Preliminary Phase (Stage I, Survey and Analysis, July 1, 1967 - October 19, 1968); (2) Program Definition Phase (Stage II, System Design, July 1, 1968 - December 31, 1969; and Stage III, Advanced System Design, July 1, 1969 - July 30, 1971); and (3) System Acquisition Phase (July 1, 1971 - about 1975).

It is important to stress that the purpose of the current Stage III, which is included in the Program Definition Phase, is not yet LINCS acquisition (i.e. full-scale system implementation). CAL's annual long-term projections for the four years following a current year provide for a LINCS Acquisition Program in terms of major system-function components (bibliographic, composition, dissemination, etc.) to be acquired during a four- to five-year period after July 1, 1971, as well as in terms of maximal and minimal funding requirements for research, development, and operation.

3. Survey-and-Analysis Stage

The two principal objectives for Stage I (1967-68) were to

(1) conduct a series of surveys and analyses of the existing information-system as a first prerequisite to long-range information-system planning;

(2) study priority components of the future information system, with an emphasis on indexing tools and system automation.

Objective (1) was implemented in Project A, Information-System Planning Approaches, with an emphasis on descriptive and statistical data required toward an operational definition of the user community and its information channels, including a limited sampling of communication behavior among language scientists. The data collected indicate that the existing communication system in the language sciences is sizable in terms of both the population and the literature. 36 centrally relevant professional organizations were identified, and the potential number of users of a LINCS in the United States has been estimated to range from 100,000 to 175,000. This includes approximately 4,000 members of the professional core community in linguistics. Some 2,000 journals have been identified which publish papers of interest to the language sciences. Steps have been initiated to study the citation patterns of these papers. Over 40 services provide bibliographies and abstracts for the world's annual output of approximately 20,000 documents. Nearly 60 information centers and services that process language information are accounted for in the Project's inventory. The result was the attainment of a first limited base line for the rational planning of a future information system, including further data collections toward this goal.

Objective (2) was implemented in Project B, Priority System Components, with an emphasis on technical characteristics of published information, a preliminary listing of computer software systems, and the collection of existing tools for indexing and classification. About 2,500 terms were collected from indexing tools and classifications dealing with interdisciplinary aspects of language. An interim bibliography of over 70 dictionaries of linguistic terminology was

compiled, and 69 computer-based file-management software systems were listed as possible candidates for further study.

4. System-Design Stage

Stage II (1968-69) emphasized the following two major objectives:

(1) Continued study of the existing information system and determination of the constraints on a feasible set of configurations for a Language Information Network and Clearinghouse System (LINCS).

(2) Studies of indexing tools and related system automation aspects fundamental to the development of priority components of LINCS upon which subsequent technical system design decisions may turn with safety.

Objective (1) was pursued mainly within Project A, Formulation of LINCS Service Objectives, whose final results will be reported in the near future. The user community was studied from several points of view. (1) A questionnaire designed to investigate information exchange at meetings in the language sciences was mailed to the participants of some of these meetings. (2) The questionnaires returned by scientific linguists in response to the 1968 circularization of the National Register of Scientific and Technical Personnel of the National Science Foundation were examined to produce a quantitative and qualitative description of this core group of the language-sciences community. (3) A descriptive listing of societies related to the language sciences, including such information as number of members and names of publications, was initiated. Meetings sponsored by these societies, along with others related to the language sciences, are the subject of a separate list. Overlap in society membership was explored in the third study.

The results of certain behavioral studies of the user population will also become available. (1) A limited sample of active linguists was interviewed to establish the current information-exchange practices and needs of the scientific linguist in a preliminary manner. (2) In a survey of information practices among members of the Linguistic Society of America, a questionnaire study evaluated the operation of information-exchange mechanisms among those persons composing the core of the linguistic community and the variables which affect it, to arrive at a preliminary determination of the distribution of subject-matter interests among these scientists. (3) An "unobtrusive measure" of communication patterns was attempted in a study of citations in a selection of linguistic core journals. (4) The Washington, D.C. case study covered representative language-science activities in a metropolitan area and the people carrying

them out. The procedures used included questionnaire and interview studies of individual language scientists, a survey of the activities and facilities of selected representative organizations, and an analysis of statistical data for D.C. area respondents to the NRSTP questionnaire. The study sought to determine the scope of the language sciences in the Washington area; the relation between the various disciplinary areas which constitute the language sciences in terms of personnel and lines of communication; the number and identity of those people most actively using the various media of communication; and the variables which most directly affect their choice of these media. It is expected that many of the findings will be generally applicable to the language sciences in the country as a whole.

A separate study of LINCS design alternatives will be outlined in a preliminary report.

Objective (2) was implemented mainly within Project B, Study of Priority System Components for LINCS. The reports on Project B will include preliminary principles for the construction of a comprehensive thesaurus for the language sciences, criteria for the selection of a file-management system for LINCS (essentially, a set of computer programs), and data on document characteristics and typographic requirements.

5. Advanced System-Design Stage

Stage III (1969-71), which began on July 1, 1969, is concentrating on the following major and minor objectives:

A. Main goals for program definition (Project A).

(1) Data and analytical findings on the operational requirements (user needs, etc.) of the current communication system in the language sciences (Task A.1).

(2) An explicit definition and specification of an optimal system concept for LINCS, its subsystems, and major components, as well as a comprehensive plan for the systematic implementation (system acquisition) of this concept (Task A.2).

(3) A set of program management capabilities, including a Program Management Information System, community advisory functions, adequate arrangements for a managerial and technical cadre and for advance planning (Task A.3).

B. Priority subgoals for system concept definition (Project B).

(1) A comprehensive indexing tool for the language sciences, including preliminary recommendations for its use for document indexing and retrieval (Task B.1).

(2) Analyzed data on the costs, performance and technical characteristics of the major automated components of a future LINCS (Task B.2).

(3) Analyzed data on the costs, performance, technical characteristics of three important publication subsystems -- a demand publication subsystem for articles, a secondary publications subsystem, and a review publication subsystem -- including some experimental products resulting from limited prototype studies of these subsystems (Task B.3).

The extent to which these objectives can actually be implemented within the proposed time table will depend on the levels of additional funding for the Project. It is hoped, however, that a number of measures can be carried out soon on a more or less limited scale, including most of the following.

The primary objective of Task A.1 is to generate a coherent pattern, including all significant data, characterizing the existing communication system of the language sciences and, especially, its operational requirements (information producer and user needs, market demands, service deficiencies, etc.). Task A.1 includes the following sub-objectives: (1) a significantly increased set of structured data on formal channels (journals, etc.), (2) in-depth analyses of the informal networks of communication of productive linguists, (3) survey findings on patterns of information flow and formal/informal subsystem interaction, (4) survey findings on information practices of language scientists outside the core field of linguistics, (5) if possible, findings on information-seeking behavior within a "typical" university and (6) analyses of marketing prospects for LINCS services and products.

Task A.2. covers the primary architectual effort which will generate the LINCS network design and master construction plans. The specific objectives of Task A.2 are to provide (1) an operationally meaningful formulation of LINCS service objectives, (2) a specification of the LINCS concept, subsystems, and major components, (3) a detailed provisional specification of LINCS subsystem design elements, and (4) a detailed plan for LINCS implementation and transitional operation. This Task covers a series of efforts beginning with the formulation of possible system or network concepts and proceeds through the selection of one specific concept, concluding with the formulation of plans required to implement the selected scheme. Service objectives and

system-function requirements will be determined and translated into system-design concepts, which in turn will lead to system selection and implementation planning. Throughout the effort there will be frequent and active communication and interaction with the other Task efforts and with the community, both to gather baseline data for systems planning, and to test out the validity and feasibility of possible system alternatives. Descriptive modeling techniques will be utilized to the extent possible in order to simulate the performance of candidate concepts and to provide quantitative indices of probable system operating characteristics.

The objectives of Task A.3 are to provide or plan for (1) an effective data-banking, communication, and control capability for Project management, (2) professional community advisory functions, (3) an adequate managerial and technical cadre, and (4) advance planning. The approaches involve standard information-processing methods for data banking, management communication and control functions, including PERT techniques, conferences and consultations, personnel selection, as well as programming, planning and budgeting.

The objectives of Task B.1 are (1) construction and preliminary tests of a comprehensive indexing tool for the language sciences, (2) exploration of document-indexing approaches, (3) study of indexing-tool management and updating problems, and (4) preliminary exploration of retrieval techniques. The approaches emphasize the requirement that the indexing and retrieval subsystems must serve the users of LINCS in a useful, realistic, and efficient manner, within reasonable economic constraints. Standard techniques for the construction and design of indexing and retrieval subsystems will be used wherever they are found to be appropriate. However, such approaches as automatic indexing will also receive a measure of attention -- at least in a preliminary way. Environmental tests will be included as well.

Task B.2 seeks to generate provisional conceptual and cost/performance data for the automation of functional processing components and on file-management approaches for LINCS, with a view toward forthcoming technologies. The entire range of system components from input to processing and output will be studied to determine the optimum choices among several alternatives for automation. In selecting best methods, the following factors will be analyzed, with cost/performance trade-offs, where applicable: throughput characteristics, including response time for retrieval requests (total time, not just processing time); types, nature, frequency of inputs and outputs; cataloging rate; resource requirements; volume of files to be stored; level of detail; file organization; file updating time; backlog of requests; cataloging backlog; number of users accommodated; number of requests; number of requests satisfied; adaptability to change; user accountability; user languages. There is considerable work now in progress addressing all these factors; the results, where applicable, will be used.

The chief objective of Task B.3 is to define detailed publication subconcepts for articles, secondary publications, and reviews as a prerequisite to the principal LINCS design activity (B.2). In addition, B.3 will provide an experimental (operational) environment for the preliminary tests and surveys envisaged in several subtasks of Stage III. Modern techniques within the state of the art will be used in the design and operation of the prototype subsystems. The topical coverage will be confined to several carefully selected specialties such as social dialects, automatic language processing, mathematical linguistics, and psycholinguistics. The final choice will be made on the basis of specific user priorities as well as readiness conditions. An attempt will be made to integrate related operations of the limited subsystems for articles, secondary publications (bibliographies, abstracts, indexes), and reviews. Secondary publications use primary ones and reviews are prepared by using both primary and secondary publications. Therefore, a common photocomposition scheme that will allow automatic recombination of the various elements will be highly useful. This will reduce redundant storage as well as duplication of pre-publication processing. Costs will be analyzed to assure an economically acceptable system. To the extent possible, cooperative arrangements will be sought toward a reduction of human processing, computing, composition, and printing costs. Data will be collected on the marketing performance of the experimental products.